

To help decrease air pollution in the southeastern portion of Wisconsin, the Department of Natural Resources (DNR) created regulations to control emissions from operations with volatile organic compound (VOC) emissions. These regulations require a number of specific industries to reduce their VOC emissions. VOCs have been found to be a primary component in the formation of bad ozone (smog). The complete rules can be found in chapter NR 422 of the Wisconsin Administrative Code (Wis. Adm. Code).

Do These Rules Affect My Business?

It depends on what type of business you operate and where you're located. Some of these VOC (volatile organic compound) rules affect an industry no matter where it's located in Wisconsin, but only if the facility is a major source of VOC emissions. A major source is one with the maximum theoretical emissions of VOCs of:

- ✓ at least 25 tons per year in the nonattainment counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha; and
- ✓ at least 100 tons per year of VOCs in all other counties in Wisconsin.

The maximum theoretical emissions of VOCs means the emissions from your operations at their absolute highest production level physically possible by their design, but you can take into account restrictions written in a permit that limit the amount of VOCs you can emit. It does not consider any control device that might be used to reduce emissions. Maximum theoretical emissions are not just the maximum level you've ever operated your process line at; they could be much higher. The process design factor may be the maximum conveyor line speed if you paint parts attached to an overhead conveyor line, maximum press speed, etc.

The ozone nonattainment area for the VOC rules covers the southeast shoreline of Lake Michigan. Affected counties include:

Kenosha	Kewaunee	Manitowoc
Milwaukee	Ozaukee	Racine
Sheboygan	Washington	Waukesha

(Door and Walworth, in some rules)

Counties that border the nonattainment area may be affected by some of these rules as well. The border counties include:

Brown	Calumet	Dane
Dodge	Fond du Lac	Jefferson
Outagamie	Rock	Winnebago

For example, if you are located in Door county and you have a construction permit that limits your whole facility's VOC emissions to 90 tons per year you would NOT be considered a major source in that county and would likely be exempt from these VOC rules.

Exemptions to These Rules

There are multiple exemptions in chapter NR 422, Wis. Adm. Code. One exemption is available to any facility affected by chapter NR 422 with very small usage of coatings or inks that don't meet the limits specified in the rule. The coatings or inks are exempt from the limits on VOC content or emissions reductions so long as the company uses **less than 55 gallons during any 12 consecutive months**. To show they meet this exemption, a company would need to maintain monthly records and determine at the end of each month whether their usage over the previous 12 consecutive months was less than 55 gallons.

Other exemptions in the rule depend on which industry sector your company fits in. **Table 1** lists the coating process or industry and the section of NR 422 which each have two possible exemptions:

TABLE 1	
Coating process/ industry	Section of NR 422
Can (beverage)	422.05
Coil	422.06
Paper	422.07
Fabric/vinyl	422.08
Auto/light truck	422.09
Metal furniture	422.10
Large appliances	422.11
Magnet wire	422.12
Flat wood panel	422.13

❶ any affected coating process(es) with less than 15 pounds VOC per day, **or**

❷ facilities located outside the nonattainment and border counties with less than 100 tons per year (TPY) of VOCs.

For example, if you have a **flat wood panel** coating line, you are located in **Waupaca county** and your maximum **VOCs total 120 TPY** you are affected by the limits in s. NR 422.13, Wis. Adm. Code.

Table 2 lists coating processes that have three possible exemptions.

First, all facilities located outside the nonattainment counties are exempt. Then in the nonattainment counties there are two exemptions:

❶ any affected coating process(es) with less than 15 pounds VOC per day, **or**

❷ facilities with VOCs less than 100 TPY in Door, Kewaunee, Manitowoc or Sheboygan **or** 25 TPY in the rest of the nonattainment counties. These processes are:

TABLE 2	
Coating process/ industry	Section of NR 422
Leather	422.085
Wood door *	422.132
Molded wood *	422.135
Graphic arts	422.14
Screen printing*	422.145

* These do not include Door as a nonattainment county.

Table 3 lists the coating processes with other exemptions. The exemptions for these coating processes or industry sectors in Table 3 are so varied, it is best to refer to the specific rule if your facility fits within the category.

TABLE 3	
Coating process/ industry	Section of NR 422
Auto refinishing	422.095
Wood furniture	422.125
Adhesives	422.127
Lithographic printing	422.142
Miscellaneous metal parts	422.15
Fire/emergency vehicle	422.155

What Do I Do if I'm Exempt?

How you show that you are exempt from the VOC rules will depend on which exemption you meet. If you are exempt solely because of where you are located, then you don't need to do anything else. If you are exempt because your emissions are below one of the exemption levels, then you will need to keep some records.

Each of the exemption levels is based on some quantity of VOC emissions over a set period of time. The time period in the exemption tells you how often you need to keep records. For the 15 pounds per day exemption, you will need **daily records** to show you emit less than that level every day you operate. The most difficult part of this is calculating the quantity of your VOC emissions.

❶ Find records of the amount of coatings you use for the time period in the exemption. You may be able to get monthly purchase records from your supplier if you don't retain your own records. The information from your supplier will only give you an idea of where you've been. ***Once you figure out you are exempt, you will need to start maintaining your own records appropriate to the exemption level you meet.***

❷ Get copies of the Material Safety Data Sheets (MSDS) for each coating you use. These would also come from your coating supplier. Look under the Physical Characteristics section of the MSDS and be sure it has either:

- ❖ VOC content in pounds per gallon (lb/gal), OR
- ❖ VOC content in percent (%) by weight (wt) AND Density of Coating in lb/gal.

❸ If any MSDS does not have the value for VOC content in units of pounds per gallon, you should be able to get that information from your supplier. They should know the VOC content of the materials they supply to you. If that information is not available, you can still calculate it from the VOC content in percent

by weight (% by wt) and the coating density. These items are found more often than the VOC content in pounds per gallon.

DO NOT use the VOC content in “pounds VOC per gallon, excluding water” if it is provided on the MSDS. Also note that you cannot swap VOC content in percent by VOLUME for percent by WEIGHT. They are both very different values and are not appropriate for calculating actual emissions from the coatings used.

Equation:

Coating Density (lb/gal) X VOC Content (% by wt)/
100 = VOC Content (lb VOC/gal)

MSDS information:

Coating Density = 14 lb/gal
VOC Content = 40 % by wt

Calculate:

14 lb/gal X 40/100 = 5.6 lb VOC/gal

④ Once you have the VOC content in lb/gal, you can calculate the VOC emissions. Multiply the VOC content by the amount of coating used in a day, in gallons and you have pounds VOC per month for that coating. If you used 2.5 gallons of the coating with 5.6 lb VOC for one day:

2.5 gal/day x 5.6 lb VOC/gal = **14 lb VOC/day**

⑤ Do this calculation for each coating you use for each day of operations. Also, you should include VOCs from clean up solvents directly related to the process, like gun cleaner for painting operations. Then add up the VOC emissions from all the coatings and solvents used to get the total VOC emissions in pounds per day. In that case, if the daily emissions are less than 15 pounds VOC then you meet one of the exemptions.

If you meet a different exemption, you will have to do a similar calculation, just adding up the emissions from coatings used for the period of time indicated in the exemption (pounds per month, tons per year, etc.). Keep records of these calculations if you do meet an exemption. Any records you make need to be kept on site, whether paper or electronic, for **five** years.

How Does My Business Comply With These Regulations?

Again, each rule is slightly unique in what limits have to be met and what records are necessary to show you are meeting those limits. They all are based on the amount of VOCs in the material used to coat your product versus the volume of material either used or coated.

The units used in the limits in the rules include: pounds VOC per gallon coating applied, excluding water in the coating; weight or volume percent of VOC in the coating applied; pounds of VOC per pound of coating applied; pounds VOC emitted per square foot of material coated.

To comply with each of the limits, you would need to keep regular records of what coatings you use. Those records should include the following items at a minimum:

- ❖ Name or an identifying number for each coating.
- ❖ VOC content for each coating, in pounds VOC per gallon, excluding water (or whatever units of measure the limit is in).

You might need to average the VOC contents of all your coatings used because some of the coatings are well below the limit while others are higher than the limit. The rules require that you do that sort of averaging over each day of operation. If you do any kind of averaging you will also need to keep records of the amount of each coating used. Contact DNR or SBCAAP staff to be sure you are doing the averaging according to the rule requirements.

The "pounds VOC per gallon, excluding water" unit is the one used by the majority of sections in NR 422, Wis. Adm. Code. You must calculate this value to show compliance if any of your coatings contains some fraction of water. Some MSDS may give you this number directly. If your coatings do not have any water content, then this calculation is unnecessary and the VOC content calculation shown previously is all that you need.

How do you calculate “pounds VOC per gallon coating applied, excluding water”? You need a number of items from the MSDS to calculate the lb VOC/gal, excluding water.

- ☐ Water content, in percent by weight (% by wt) (we will use 5%)

- ☐ Total Volatile content, in percent by weight (% by wt) (Using 40% VOC + 5% water = 45% from above example.)
- ☐ Density of coating, in pounds per gallon (lb/gal) (using 14 lb/gal from above example)
- ☐ Density of water = 8.34 pounds per gallon

Once you have the items listed above, you calculate the "pounds VOC per gallon coating applied, excluding water" for each coating used as follows:

$$\begin{array}{l}
 \text{1. Water in coating:} \\
 \frac{14 \text{ lb coating}}{\text{gal coating}} \times \frac{5 \text{ lb water}}{100 \text{ lb coating}} = \frac{0.70 \text{ lb H}_2\text{O}}{\text{gal ctg}} \\
 \\
 \text{2. Volume water in coating:} \\
 \frac{0.7 \text{ lb water}}{\text{gal coating}} \div \frac{8.34 \text{ lb water}}{\text{gal water}} = \frac{0.084 \text{ gal H}_2\text{O}}{\text{gal ctg}} \\
 \\
 \text{3. Mass of VOC in coating:} \\
 45\% \text{ volatile} - 5\% \text{ water} = 40\% \text{ VOC} \\
 \frac{14 \text{ lb coating}}{\text{gal coating}} \times \frac{40 \text{ lb VOC}}{100 \text{ lb coating}} = \frac{5.6 \text{ lb VOC}}{\text{gal ctg}} \\
 \\
 \text{4. lb VOC per gallon, less water:} \\
 \frac{5.6 \text{ lb VOC}}{\text{gal coating}} \div \frac{(1-0.084) \text{ gal -H}_2\text{O}}{\text{gal coating}} = \frac{6.11 \text{ lb VOC}}{\text{gal - H}_2\text{O}}
 \end{array}$$

The value of **6.11 lb VOC per gallon, excluding water**, is what you would record after using that calculation for each coating to show that you meet the VOC content limit.

Another value you might have to calculate for your records, if it applies to you, is the "lb VOC per 1000 square feet coated" value for the leather or flat wood paneling RACT rules. For this value you need three items:

- ☐ VOC content of the coatings used, in pounds VOC per gallon.

- ☐ Amount of coatings used for a specified time period, in gallons.
- ☐ Amount of material coated for a specified time period, in square feet of surface area coated.

Similar to the daily emissions calculations shown previously in the exemption section, you multiply the VOC content by the amount of coating used to get the pounds of VOC emitted for the time period.

Then you divide the VOC emissions by the total square footage of surface area coated for the same time period. This gives you a value of X lb VOC per 1 square foot. The required unit is X lb VOC per 1000 square feet. So you multiply your value (X) by 1000/1000 to get the emissions rate in lb VOC/1000 square feet.

$$\begin{array}{l}
 \text{VOC content} = 5.6 \text{ lb/gal} \\
 \\
 \text{Amount coating used} = 50 \text{ gallons/month} \\
 \\
 \text{Amount of material coated} = 13,485 \text{ square feet/mo} \\
 \\
 \text{VOC emissions} = \\
 5.6 \text{ lb VOC/gal} \times 50 \text{ gal/mo} \div 13485 \text{ sq ft/mo} \\
 \\
 = \frac{0.02076 \text{ lb VOC}}{1 \text{ sq ft}} \times \frac{1000}{1000} \\
 \\
 = \mathbf{20.76 \text{ lb VOC/1000 sq ft}}
 \end{array}$$

Similar calculations to those shown above can be followed for all the units in the different VOC rules. There are a number of resources you can use for assistance with these calculations if you have trouble. Contact the SBCAAP or DNR regional staff for help on determining how you are affected by these rules as well as the VOC calculations.



Contacts for More Information or Assistance.

The Small Business Clean Air Assistance Program helps smaller businesses understand and comply with the Clean Air Act regulations. Contact one of the program's Clean Air Specialists for more assistance: Renée Lesjak Bashel at 608/264-6153 or Tom Coogan at 608/267-9214.



For further information on the RACT rules contact your DNR Regional or Service Center office shown on the **DNR Contact Fact Sheet** or the DNR's Central office at 608/266-2856.